

Patent Claims

1. Flexure pivot in the form of a thin material connection by which solid material portions are flexibly connected, for use in a force-transfer mechanism with a stationary portion and with a lever arrangement comprising:

at least one reduction lever serving to transmit a force to a measuring transducer;

at least one coupling element serving to introduce an input force into the lever arrangement, said coupling element being stiff against lengthwise deformation but flexible with regard to bending and having at least one thin material connection; and,

a flexible fulcrum pivot for supporting the at least one lever on the stationary portion and/or on a preceding lever, the flexible fulcrum pivot comprising:

a thin material connection, said flexible fulcrum pivot being a flexure pivot formed by adjacent material-free spaces and containing at least one thin material connection zone delimited by concave-shaped surfaces facing material-free spaces, wherein at least one of the material-free spaces delimiting the thin material connection zone has a shape that creates a constriction of the thin material connection zone.

2. Flexure pivot in the form of a thin material connection according to claim 1, wherein a center of rotation of the flexure pivot lies in an area of the constriction.

3. Flexure pivot in the form of a thin material connection according to claim 1, wherein the flexure pivot is an integral part of a material block and the material-free spaces are formed by narrow line cuts traversing the material block perpendicularly to its main plane.

4. Flexure pivot in the form of a thin material connection according to claim 1, wherein the flexure pivot is an integral part of a material block and

the material-free spaces are hollowed out of the material block by machine tools.

5. Flexure pivot in the form of a thin material connection according to claim 1, wherein the concave-shaped surfaces facing material-free spaces delimiting the thin material connection zone have an elongated shape with at least one depression forming a constriction of a mid-portion of the thin material connection zone.

6. Flexure pivot in the form of a thin material connection according to claim 1, wherein the concave-shaped surfaces facing material-free spaces delimiting the thin material connection zone have an elongated shape and form a constriction of the thin material connection, said constriction being shaped with a constant narrowing taper towards a middle of the thin material connection.

7. Flexure pivot in the form of a thin material connection according to claim 1, wherein the concave-shaped surfaces facing material-free spaces delimiting the thin material connection have an elongated shape, wherein at least one depression of the material-free spaces delimiting the thin material connection zone forms a constriction of the thin material connection zone, said constriction being shaped with a constant narrowing taper towards a middle of the thin material connection zone.

8. Flexure pivot in the form of a thin material connection according to claim 1, wherein each of the material-free spaces delimiting the thin material connection zone is bounded by an arcuate cutout with a first curvature radius in which an arcuate cutout with a second, smaller curvature radius is imbedded.

9. Flexure pivot in the form of a thin material connection according to claim 5, wherein an arcuate depression of the material-free spaces delimiting

the thin material connection contains further arcuate depressions with significantly stronger curvatures.

10. Force-transfer mechanism for a force-measuring device, with a stationary portion, and with a lever arrangement comprising:
at least one reduction lever serving to transmit a force to a measuring transducer;

at least one coupling element serving to introduce an input force into the lever arrangement, said coupling element being stiff against lengthwise deformation but flexible with regard to bending and having at least one thin material connection; and

a flexible fulcrum pivot for supporting the at least one lever on the stationary portion and/or on a preceding lever, the flexible fulcrum pivot comprising:

a thin material connection, wherein the thin material connection comprises at least one thin material connection zone, that is delimited by concave-shaped surfaces facing material-free spaces, wherein at least one of the material-free spaces delimiting the thin material connection zone has a shape that creates a constriction of the thin material connection zone.

11. Force-transfer mechanism for a force-measuring device according to claim 10, wherein a center of rotation of the flexible fulcrum pivot lies in an area of the constriction.

12. Force-transfer mechanism for a force-measuring device according to claim 10, wherein the lever arrangement and at least one coupling element are integral parts of a material block.

13. Force-transfer mechanism for a force-measuring device according to claim 10, wherein the force-transfer mechanism is an integral part of a material block.

14. Force-transfer mechanism for a force-measuring device according to claim 12, wherein the material-free spaces are formed by narrow line cuts traversing the material block perpendicularly relative to a plane of rotation of the at least one reduction lever.

15. Force-transfer mechanism according to claim 12, wherein the material-free spaces are hollow spaces formed in the material block by machine tools.

16. Force-transfer mechanism according to claim 10, wherein the concave-shaped surfaces facing material-free spaces delimiting the thin material connection zone have an elongated shape with at least one depression forming a constriction of a mid-portion of the thin material connection zone.

17. Force-transfer mechanism according to claim 10, wherein the concave-shaped surfaces facing material-free spaces delimiting the thin material connection have an elongated shape and form a constriction of the thin material connection, said constriction being shaped with a constant narrowing taper towards a middle of the thin material connection zone.

18. Force-transfer mechanism according to claim 10, wherein the concave-shaped surfaces facing material-free spaces delimiting the thin material connection zone have an elongated shape, wherein contour depressions of the material-free spaces delimiting the thin material connection form a constriction of the thin material connection zone, said constriction being shaped with a constant narrowing taper towards the middle of the thin material connection zone.

19. Force-transfer mechanism according to claim 10, wherein each of the material-free spaces delimiting the thin material connection zone is bounded by an arcuate cutout with a first radius in which an arcuate cutout with a second, smaller radius is imbedded.

20. Force-transfer mechanism according to claim 16, wherein an arcuate contour depression of the material-free spaces delimiting the thin material connection zone contains further arcuate contour depressions with significantly stronger curvatures.

21. Force-transfer mechanism according to claim 10, wherein the material cross-section of at least one force-concentrating end portion of a coupling element and of at least one fulcrum of the at least one lever is reduced by lateral recesses originating from main surfaces of the material block which are parallel to a plane of rotation of the at least one lever and/or wherein the at least one lever and/or its respective lever fulcrum and/or the at least one coupling element and/or its respective force-concentrating end portion are divided in two.

22. Flexure pivot in the form of a thin material connection according to claim 8, wherein an arcuate depression of the material-free spaces delimiting the thin material connection contains further arcuate depressions with significantly stronger curvatures.

23. Force-transfer mechanism according to claim 10, in combination with a balance used as the force-measuring device.

24. Force-transfer mechanism for a force-measuring device according to claim 13, wherein the material-free spaces are formed by narrow line cuts traversing the material block perpendicularly relative to a plane of rotation of the at least one reduction lever.

25. Force-transfer mechanism according to claim 13, wherein the material-free spaces are hollow spaces formed in the material block by machine tools.